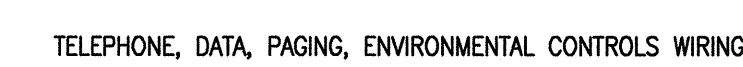
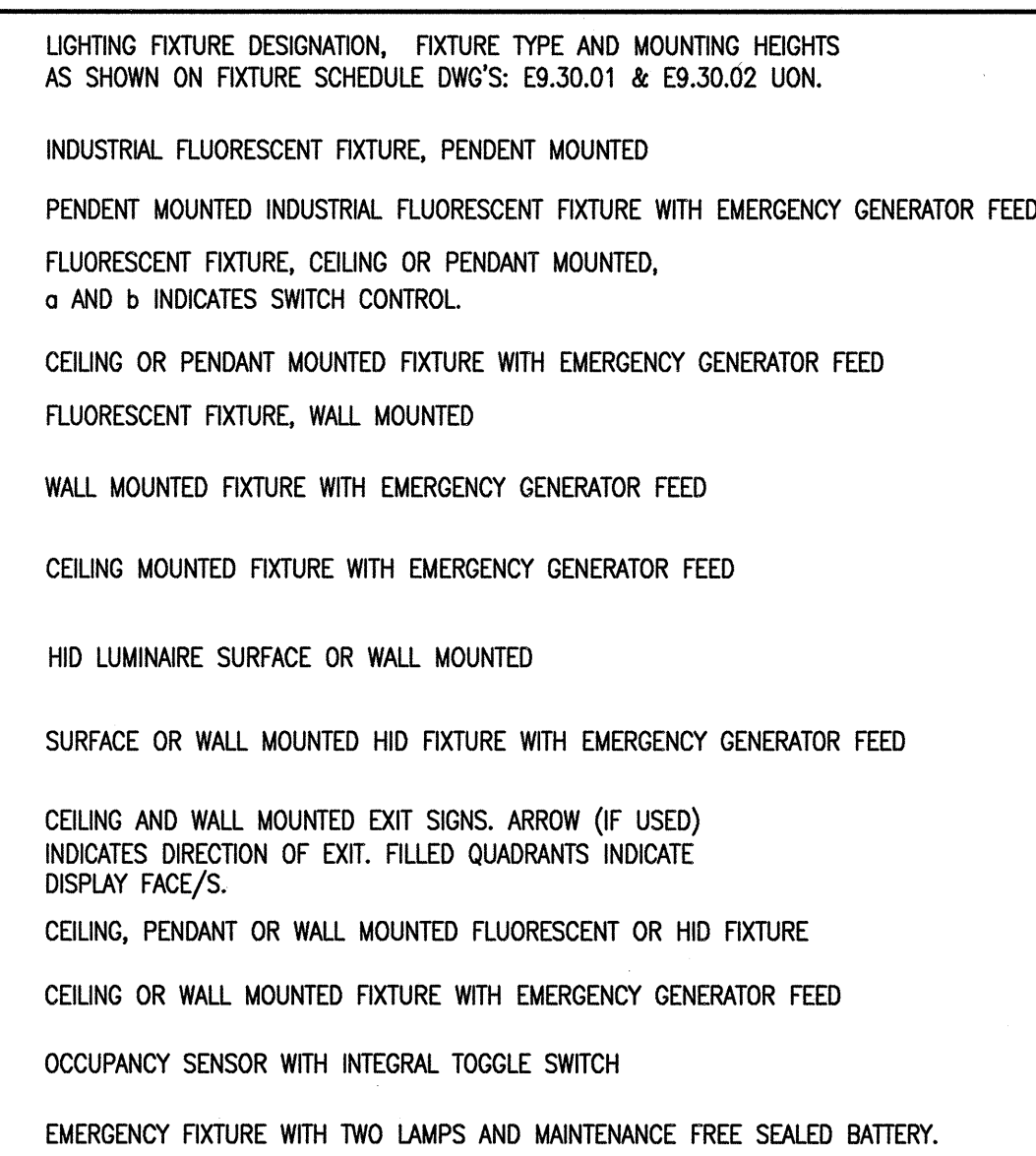
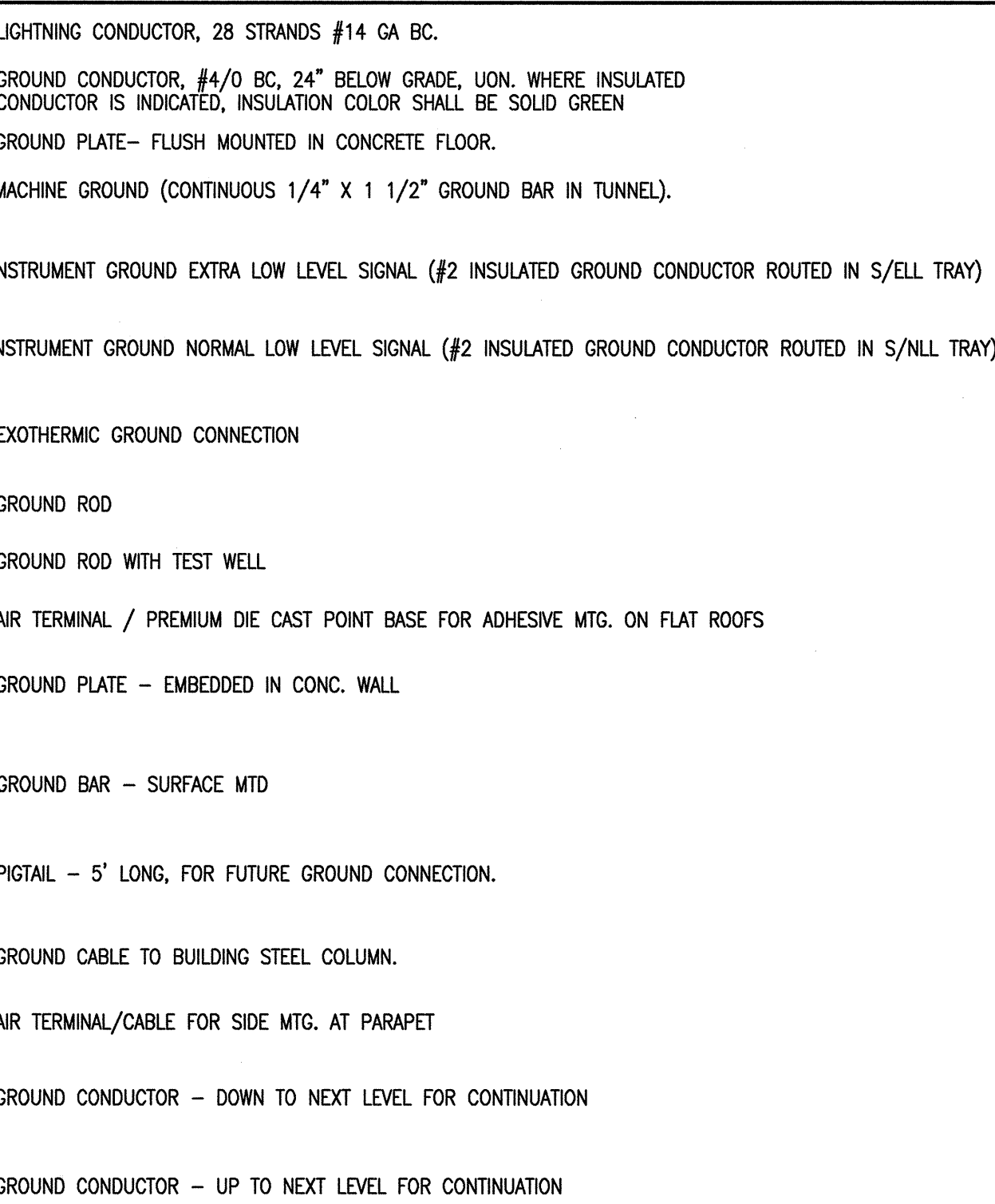
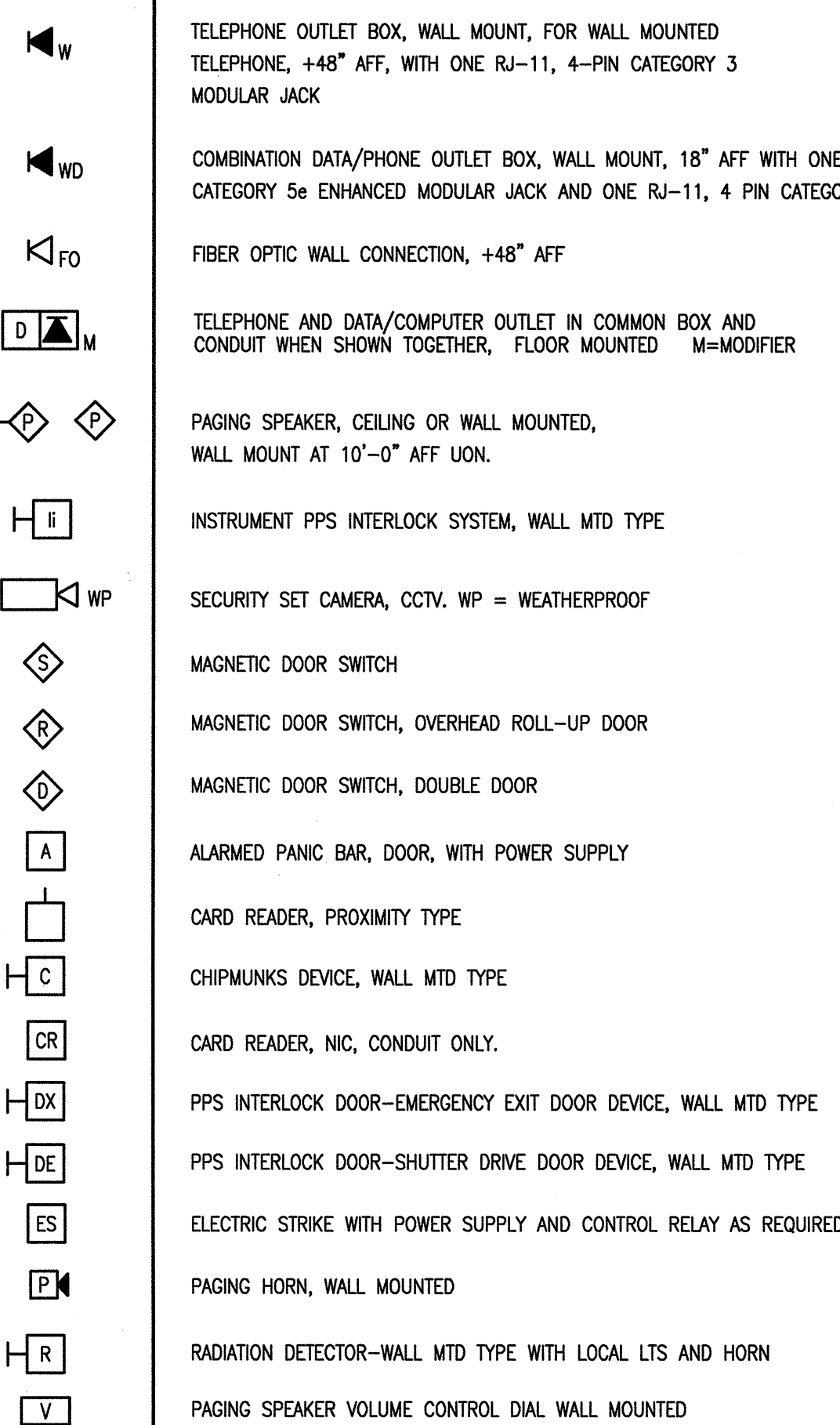
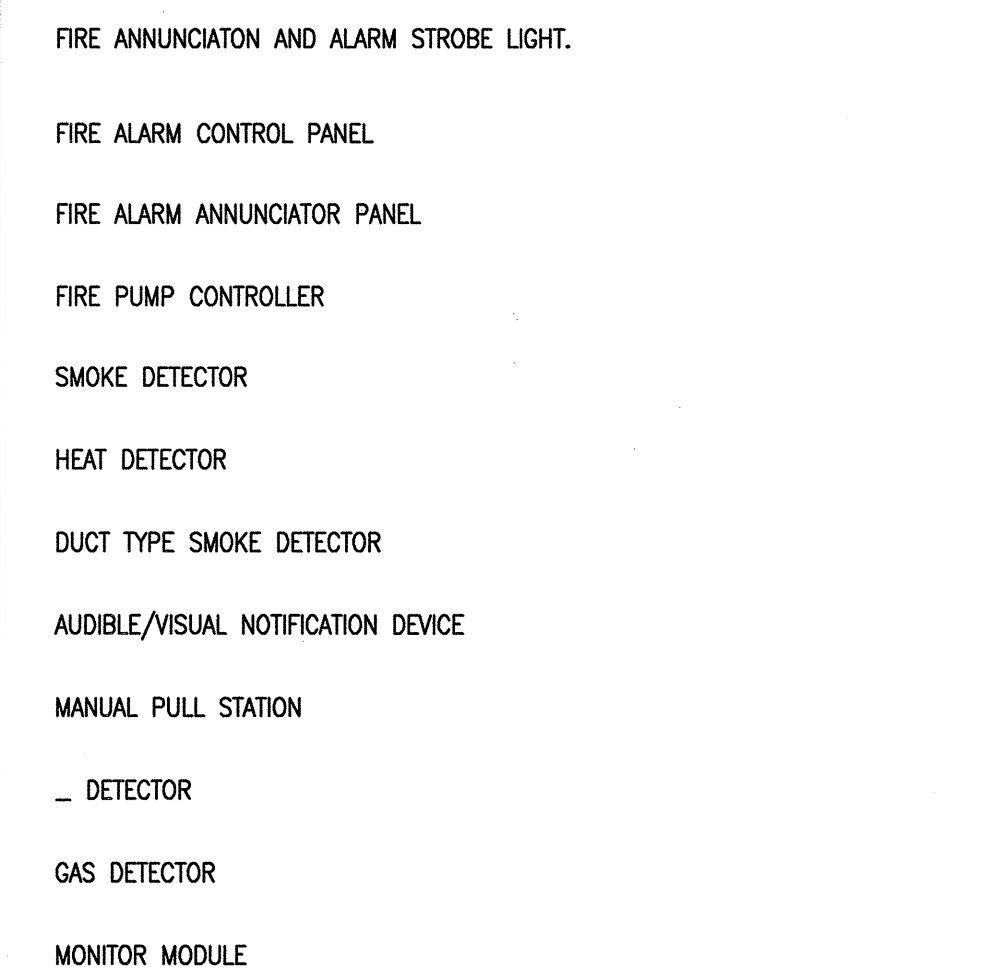
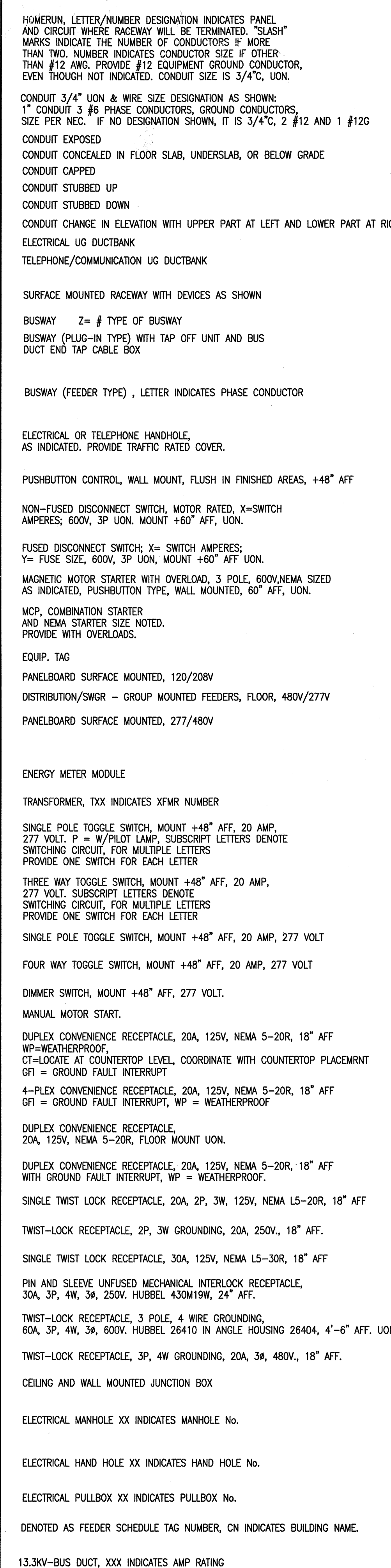
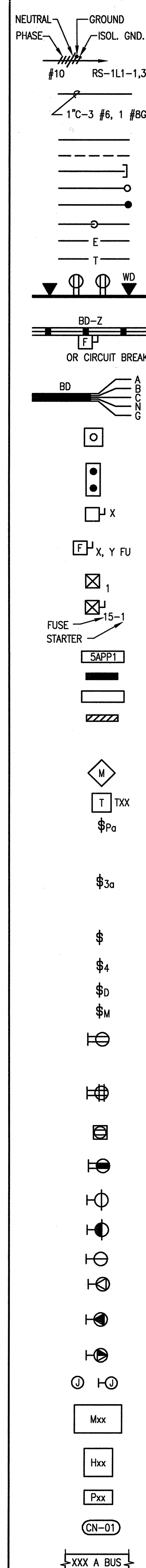
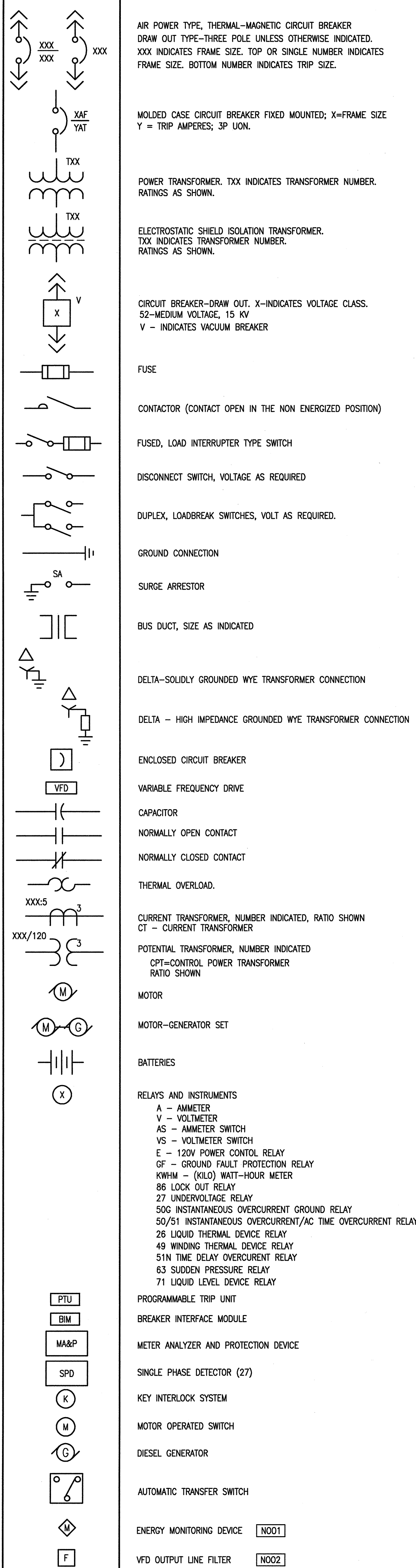


GENERAL NOTES



APXK	AMPS
APF	APPROXIMATELY
AFO	ABOVE FINISHED FLOOR
AF	ABOVE FINISHED GRADE
AT	AMP FRAME
AT	AMP TRIP
AWG	AMERICAN WIRE GAUGE
ATS	AUTOMATIC TRANSFER SWITCH
BC	BASE COPPER
BLDG	BUILDING
BOD	BOTTOM OF DUCT
C	CONDUIT
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CLG	CEILING
CI	CONTRACTOR INSTALLED
CM	CONSTRUCTION MANAGER
CMFE	CONSTRUCTION MANAGER FURNISHED EQUIPMENT
CMFE/CI	CONSTRUCTION MANAGER FURNISHED EQUIPMENT, CONTRACTOR INSTALLED
CMU	CUSTOMER METERING UNIT
CO	CONDUIT ONLY
CONT	CONTROL
CTP	CONTROL POTENTIAL TRANSFORMER
CR	CLEAN ROOM
CT	CURRENT TRANSFORMER
CU	COPPER (CABLE)
COMM, COM	COMMUNICATIONS
CPB	COMMUNICATIONS PULL BOX
CTR	CENTER
DET	DETAIL
DIST	DISTRIBUTION
DP	DISTRIBUTION PANEL
DN	DOWN
DS	DISCONNECT SWITCH
DWG	DRAWING
(E)	EXISTING
EA	EACH
ECB	ENCLOSED CIRCUIT BREAKER
EMH	ELECTRICAL MANHOLE
EMI	ELECTRIC (MAGNETIC INTERFERENCE
EMT	ELECTRICAL METALLIC TUBING
EP	EXPLOSION PROOF
EXT	EXTERIOR
FACP	FIRE ALARM CONTROL PANEL
FU	FUSE
FL	FLUORESCENT
FA	FIRE ALARM
FLA	FULL LOAD AMPERES
FO	FIBER OPTIC (CABLE)
FMR	FULL VOLTAGE NON REVERSING (STARTER)
GEN	GENERATOR
GF	GOVERNMENT FURNISH EQUIPMENT, GOVERNMENT INSTALLED.
GFE/CI	GOVERNMENT FURNISH EQUIPMENT, CONTRACTOR INSTALLED.
GI	GROUND FAULT INTERRUPTER
OND,G	GROUND
HID	HIGH-INTENSITY DISCHARGE
H-O-A	HAND-OFF-AUTO CONTROLLER
HH	HANDHOLE
HIT	HIGH INTENSITY TUNGSTEN LAMP
HP	HORSEPOWER
HPS	HIGH-PRESSURE SODIUM
HZ	HERTZ
INST	INSTRUMENTATION
JB	JUNCTION BOX
IDF	INTERMEDIATE DISTRIBUTION FRAME
IMC	INTERMEDIATE METALLIC CONDUIT
KVA	KILOVOLT AMPS
Kcmil	THOUSAND CIRCULAR MILS (CONDUCTOR SIZE)
LTCT	LIGHTING CONTACTOR
LVL	LEVEL
LTD	LIGHTING
M	METER
MCC	MOTOR CONTROL CENTER
MCP	MOTOR CIRCUIT PROTECTOR
MDF	MAIN DISTRIBUTION FRAME
MANH	MANHOLE
MEZZ	MEZZANINE
MN	MINOR
MLO	MAIN LUGS ONLY
MS	MOTOR STARTER
MTD	MOUNTED
N	NEUTRAL
NIC	NOT IN CONTRACT
NF	NON-FUSED
NF	NAME PLATE
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTDOOR
OH	OVERHEAD
OS & Y	OPEN STEM & YOKE VALVE
ø, P, PH	PHASE
P	POLE
PNL	PANEL
PA	PUBLIC ADDRESS (PAGING SYSTEM)
PV	POST INDICATING VALVE
PLC	PROGRAMMABLE LOGIC CONTROLLER
PSC	PHONE SYSTEM CABINET
PT	POTENTIAL TRANSFORMER
PPS	PERSONNEL PROTECTION SYSTEM
PVC	POLYVINYLCHLORIDE CONDUIT
PW	PULL WIRE
PWR	POWER
RECOP	RECEPTACLE
RSC	RIGID STEEL CONDUIT
RSG	RIGID STEEL GALVANIZED CONDUIT
SBC	STRANDED BARE COPPER
SECP	SECURITY CONTROL PANEL
SHT	SHEET
SUB	SUBSTATION
SM	SIMILAR
SWB	SWITCHBOARD
SW	SWITCH
S/NLL	SIGNAL LOW LEVEL (CABLE)
SP	SPARE
SQ	SQUARE
SWGR/Sg	SWITCHGEAR
TB	TERMINAL BOARD
TBL	TELEPHONE
TMH	TELEPHONE MANHOLE
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
TYP	TYPICAL
UG	UNDERGROUND
UON	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTIBLE POWER SUPPLY
UTP	UNSHIELDED TWISTED PAIR
V	VOLT
V	VOLTAPEARE
VFD	VARIABLE FREQUENCY DRIVE
KV	THOUSAND VOLTS
KVA	THOUSAND VOLTAPEARE
KW	KILO WATTS
W	WATTS OR WIRE
WP	WEATHERPROOF DEVICE OR ENCLOSURE, NEMA 3R
W/	WITH
YMR	TRANSFORMER
Z	IMPEDANCE

- ALL ELECTRICAL WORK ON THIS PROJECT SHALL COMPLY WITH THE CURRENT EDITION OF THE NATIONAL ELECTRICAL CODE.
- FIELD PANEL EXPOSED CONDUIT, WIREWAYS, PANEL BOX AND TRIM IN FINISHED AREAS. MATCH COLOR OF ADJACENT FINISHES.
- CONTRACTOR SHALL VERIFY EXACT LOCATION OF EQUIPMENT WITH ARCHITECTURAL AND MECHANICAL DRAWINGS PRIOR TO ROUGH-IN.
- CONDUCTOR SIZES ARE BASED ON 75°C AMPACITY RATING. 80°C AMPACITY SHALL BE USED FOR ALL CIRCUITS HAVING OVERCURRENT PROTECTION OF 100 AMPS OR LESS.
- ELECTRICAL SYSTEM INSTALLATIONS EXCEEDING 600V LINE-TO-LINE SHALL COMPLY WITH ARTICLE 710 OF NFPA 70 (1996).
- ALL EQUIPMENT ENCLOSURES LOCATED OUTSIDE THE BUILDING SHALL BE RATED NEMA 3R UNLESS OTHERWISE INDICATED.
- FURNISH AND INSTALL SLEEVES FOR ALL CONDUIT PENETRATIONS OF CONCRETE FLOORS AND WALLS PRIOR TO CONSTRUCTION OF SAME. CONTRACTOR SHALL ALSO MAINTAIN FIRE RATING OF SAME.
- PROVIDE ROLL ROPES IN ALL CONDUIT WITHOUT CONDUCTORS. LEAVE 18" OF SLACK ON EACH END AND IDENTIFY WITH TAGS.
- ALL #12 CONDUCTORS OVER 75' IN LENGTH FOR 120V, AND 150' IN LENGTH FOR 277V, SHALL BE INCREASED TO #10.
- PENETRATIONS OF FIRE-RESISTIVE WALLS, FLOORS, CEILINGS AND ROOF SHALL BE PROTECTED AS REQUIRED IN U.B.C. SECTION 708. STEEL ELECTRICAL OUTLET BOX AT OCCUPANCY SEPARATION WALLS SHALL NOT EXCEED SIXTEEN SQUARE INCHES AND SHALL NOT EXCEED ONE HUNDRED SQUARE FEET OF WALL BOXES SHALL BE SEPARATED BY A HORIZONTAL DISTANCE OF 24 INCHES WHEN ON OPPOSITE SIDES OF WALL.
1. A GROUND WIRE SHALL BE REQUIRED IN ALL CONDUIT RUNS.
 2. ALL CABLE TRAY SHALL BE GROUNDED AS REQUIRED FOR CONDUCTOR ENCLOSURES IN ARTICLE 250 OF THE NEC.
- BRANCH CIRCUIT LOADS:
 - A. GENERAL 20A, 120V CONVENIENCE OR MAINTENANCE RECEPTACLE CIRCUITS SHALL HAVE A MAXIMUM OF (5) OUTLETS PER 20A, 120V BRANCH CIRCUIT. STAGGER CIRCUITS SO ADJOINING RECEPTABLES ARE NOT ON THE SAME BRANCH CIRCUIT.
 - B. 20A, 120V RECEPTABLES DEDICATED FOR PERSONAL COMPUTERS OR OTHER DATA PROCESSING EQUIPMENT SHALL HAVE A MAXIMUM (3) OUTLETS PER 20A, 120V BRANCH CIRCUIT. STAGGER CONDUITS SO ADJOINING RECEPTABLES ARE NOT ON THE SAME BRANCH CIRCUIT. RUNS #10 FOR NEUTRAL CONDUCTOR.
 - C. 20A BRANCH CIRCUIT FOR LIGHTING SHALL HAVE A MAXIMUM OF 16 AMPS PER CIRCUIT, UNLESS OTHERWISE INDICATED.
1. MOUNTING HEIGHTS ARE CENTER OF BOX, UNLESS OTHERWISE INDICATED. WHERE BACK BOXES OF DIFFERENT SIZES ARE USED AND MOUNTED NEXT TO EACH OTHER OR ON THE SAME WALL, USE A COMMON CENTER LINE.

ITEM	INCHES
RECEPTABLES	18
SWITCHES, TO TOP	48
MOTOR STARTERS, TO TOP	72
DISCONNECTS, TO TOP	72
PANELS, TO TOP	72
CABINETS, TO TOP	72
JUNCTION BOXES	15 MIN.
THERMOSTAT	48
CRT/PRINTER OUTLET, TO TOP	18
WALL MOUNTED SPEAKER	84
TELEPHONE/DATA OUTLET	18
WALL MOUNTED TELEPHONE OUTLET	48
EXIT SIGNS WALL MOUNTED	90

15. FURNISH AND INSTALL SYSTEMS, UNITS, EQUIPMENT AND PARTS TO MEET OR EXCEED CURRENT APPLICABLE REQUIREMENTS FOR SEISMIC RESISTANCE SPECIFIED BY CODES, REGULATIONS OR AGENCIES HAVING JURISDICTION. INCLUDE ALL SUPPORTS, ANCHORS, BRACE AND OTHER RESTRAINING DEVICES REQUIRED. ALL SEISMIC RESTRAINTS SHALL BE IN SEISMIC ZONE 2A REQUIREMENTS OF STANDARD BUILDING CODES AND ARE THE RESPONSIBILITY OF THE CONTRACTOR. SEISMIC JOINTS HAVE 6" MOVEMENT IN ALL DIRECTIONS AT INTERCONNECT AND 4" MOVEMENT AT ALL OTHER LOCATIONS.
16. PROVIDE 120V POWER CONNECTION FROM CLOSEST RECEPTACLE TO MAGNETIC DOOR HOLDERS AND DOOR POWER SUPPLY RELAYS. SEE ARCHITECTURAL DRAWINGS AND SPECIFICATIONS FOR LOCATIONS. PROVIDE FOR FIRE ALARM SYSTEM LINE TO BE WIRED INTO CIRCUIT.
17. SOME SYMBOLS SHOWN IN SYMBOL LIST MAY NOT BE USED ON DRAWINGS.
18. ALL CB'S USED FOR LIGHT SWITCHING MUST BE U.L. LISTED AS "SWO" TYPE.

KEY NOTES

NO01 ENERGY MONITORING EQUIPMENT WILL BE PROCURED UNDER SNS SUBSTATION CONTRACT
SEE CM FOR DETAILS.

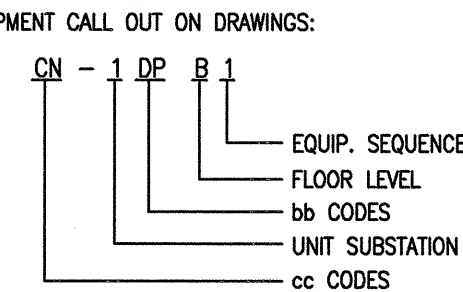
NO02 PROVIDE LINE FILTER ON VFD'S WITH ONE-WAY CIRCUIT LENGTH OF 100 FT OR MORE.

EQUIPMENT NAMING CONVENTION FOR CNMS-ELECTRICAL

THE FORMAT IS: CC - XBBLY
WHERE CC - IS THE BUILDING FOR EQUIPMENT LOCATION
X - IS THE SUBSTATION NUMBER
BB - IS THE EQUIPMENT TYPE
L - IS THE FLOOR LABEL
Y - IS THE EQUIPMENT SEQUENCE NUMBER

EQUIPMENT TYPE	db CODES
POWER PANEL, 480V, 3 PH, 3 W	P
LIGHTING & POWER PANEL, 480/277 V, 3 PH, 4 W	CR LP
PANEL, 208/120 V, 3 PH, 4W	LP
DISTRIBUTION PANEL, 480V, 480/277 V, 208/120 V, 3 PH 3W & 3 PH 4W	DP
EMERGENCY POWER PANEL, 480V, 3 PH, 3W	EP
EMERGENCY LIGHTING & POWER PANEL, 480/277 V, 3 PH, 4W	EPP
EMERGENCY PANEL, 208/120 V, 3 PH, 4W	EPP
EMERGENCY DISTRIBUTION PANEL	EPP
TRANSFORMER	EQ
EMERGENCY GENERATOR	EG
AUTOMATIC TRANSFER SWITCH	ATS
UNIT SUBSTITUTION	CS
SWITCH GEAR	CS
MOTOR CONTROL CENTER	MCC
UNINTERRUPTIBLE POWER SUPPLY	UPS
UNINTERRUPTIBLE EMERGENCY PANEL	UPS
LIGHTING CONTACTOR	LC
VARIABLE FREQUENCY DRIVE	VFD
FAN FILTER UNIT	FFU

BUILDING NAME	cc CODES
CENTER FOR NANOPHASE MATERIAL SCIENCES	CNMS



ORNL DRAWING NUMBER:

Knight/Jacobs Joint Venture
701 Scarboro Road, MS 8253
Oak Ridge, TN 37830

m+w zander

PROJECT NAME:

CENTER FOR NANOPHASE MATERIALS SCIENCES

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